

SKILL NEEDS OF TECHNICAL TEACHERS IN APPLYING EMERGING TECHNOLOGIES FOR TEACHING IN TECHNICAL COLLEGES IN BENUE STATE, NIGERIA.

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Abstract

The study was carried out to determine the skill needed by technical teachers in applying emerging technologies for teaching in technical colleges in Benue State. Two research questions were developed for the study. The study adopted descriptive survey design. The area of study was Benue State of Nigeria. The population for the study was 36 technical trade courses teachers drawn from the eight technical colleges and one basic skill centre in Benue State. A 26 questionnaire items was developed for data collection. Three experts in the Department of Industrial Technical Education, University of Nigeria, Nsukka validated the instrument. Cronbach Alpha coefficient reliability of 0.94 was obtained for the instrument. Mean was used to answer the research questions while one hypothesis was tested at the .05 level of significance. The findings of the study revealed that technical teachers teaching in technical colleges in Benue State lack skills in ICT and diagnostic process on applying emerging technology in their trades. The findings also revealed that technical teachers in technical colleges need further training for skill acquisition in modern technologies especially in operating and servicing of equipments and machinery systems. Based on the findings, it was recommended that technical teachers teaching in technical colleges should be trained for making use of emerging Technologies so as to be able to teach in technical colleges effectively.

Key Words: Skills, ICTs, Technical teachers, Teaching, Technical Education, Emerging technologies.

Introduction

The major aims of technical colleges are to produce skilled technicians for the maintenance of all brands of vehicles, machineries, facilities and production of items. In teaching technical trades in technical colleges, certain level of skills in all area of maintenance, repairs and skilled production are expected to be attained. The possession of such knowledge and skills enable the technical teachers to impart them to the students in various trades. The Federal Republic of Nigeria (FRN) (2013) stated that teachers should be provided with the intellectual and professional background (skills)

adequate for their assignment (teaching) and made adaptable to changing situations. This is to satisfy the goal of including technical trades in technical college curriculum as spelt out by FRN. Thus, the goal of technical programmes in technical college is to produce competent technicians with sound theoretical knowledge and manipulative skills who should be able to diagnose and carry maintenance on all types of machineries/facilities or produce products that would be marketable in open markets on competitive basis (FRN, 2004).

The emergence of modern/emerging technologies in all trades has brought along with many challenges among which are the

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skills required by technical teachers in ICT and maintenance of the emerging technology machineries. These skills are however necessary and needed by technical teachers if skilled technicians are to be provided for the maintenance of modern vehicles and sophisticated computerized machines and equipment in almost all the trades in technical colleges students acquire relevant skills when a teacher uses relevant technology. Skill is the capability of accomplishing a job with precision or certainty, practical knowledge in combination with ability, cleverness and expertness. According to Okeke (2002), skill is just indispensable in technical college orientation to do something expertly and well in accordance to set standard or manufactures instruction. Okeke further stated that to possess skill is to demonstrate the habit of acting, thinking and behaving in a specific way such that the process becomes natural through repetition of practice.

Emerging technologies are those whose operations and control are based on computer operations. Byron (2010), defined emerging technologies as those technical innovations which represent progressive developments within a field for competitive advantage. Emerging technologies represent previously distinct fields which are in some way moving

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towards stronger inter-connection and similar goals. However, the opinion on the degree of impact, status and economic viability of several emerging and converging technologies vary. The teaching of technical trades using emerging technologies in technical colleges should reflect this interconnection and goals.

Teaching is a profession that needs constant training and retraining of teachers especially in emerging technologies. According to Allen, Walker & Morehead (1999), many educators are limited in the technological skills needed for successful technological integration in career and technical education curricular due to the lack of recent training in professional field. Rockhill (2005) stated that the aims of in-service training to include exposing the trainee to new ideas and innovation in their subject areas providing them with recent trends and development in teacher education, giving opportunities for teachers to exchange ideas, exploration and experiences among professional colleagues thereby broadening their minds and outlook. According to Ogbaunya & Usoro (2009), the making of technical teachers is not a day job but a continuous one. Apparently, it seems, with the trend of teacher's preparation in Nigeria, technical teachers have been given yesterday's education to tomorrow's citizens.

The recent development in teaching is so complicated. In view of this, Schwaller noted that today's technical teachers and technicians must understand not only the parts, nomenclature, functions and operations but also most importantly, the diagnosis and service procedure for each systems. (Schwaller,

1993). Technical systems today are controlled by various electronic sensors, circuits and computers. The technical service teachers must have sound knowledge of electrical principles and troubleshooting procedures to diagnose and service many electrical problems found on the emerging technologies in various trades (Riovdan & Rossa, 2003). The information revolution of Information and Communication

Technology (ICT) is significant in the development of the 21st century. This calls for basic skills in computer operations, programming and handling. It will also promote skills required for technical maintenance, repairs and skills.

The term maintenance means different things to different people depending on the way it is perceived even within the technical trades (Ogbuanya, 2009). The author further stated that there are three classes of maintenance namely; preventive, predictive and corrective maintenance. Giving insight into the classes of maintenance, Ogbuanya described preventive maintenance activities as including scheduled inspection for early detection and remediation of causes leading to failure. This causes include adjustment, repairs, replacement of equipment/item, parts regular cleaning, lubrication, (oiling or greasing), painting and servicing at an economic basic at calculated intervals before failure could force an emergence shutdown, planned preventive maintenance reduces the possibility of failure and performance degradation. It also saves time and money. Predictive Maintenance: It is concerned with application of useful strategies to forestall a breakdown when danger signals are observed in these circumstances. It means that when danger signals in the operation of the equipment. Mills (1992) further expressed that predictive maintenance is a regular periodic work that may be necessary to retain the performance characteristics of a product. This type of maintenance is also required to replace or repair the product after it has achieved a useful life span. While

Corrective Maintenance: Corrective maintenance according to Olaitan et al (1999)

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involves approaches for rectifying an already damaged or breakdown equipment, machinery or facilities.

Statement of the Problem

The aim of establishing technical colleges by Benue State Government is to prepare students adequately for successfully entrance into and advancement within the industries and services to self and society. To fulfill the aim successfully, the technical teachers in the technical colleges must all the times be abreast and in-tune with emerging technologies, its curriculum contents and must have suitable skills in pedagogy as well as good knowledge of ICTs which is the key to the operation of modern vehicle, equipment and machines especially those in the area of maintenance and repairs of faults in technical trades.

As the situation is now in technical colleges in Benue State, however, it seems that lack of modern cal technical knowledge, competencies and skills by technical teachers most especially on emerging technologies in trades seem to be responsible for the students being restricted in skills, efficiency, proficiency and productivity hence, the rate at which unemployment is increasing at very dangerous and alarming rate. It is for this reason that this study on skill needs of technical teachers in teaching emerging technologies in trade courses in technical colleges in Benue state is being undertaking to determine and identify critical areas of skill updating by technical teachers.

Purpose of the Study

The main purpose of this study was to investigate the skills needs of technical teachers in teaching emerging technologies in

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technical colleges in Benue State. Specifically, the study is to:

1. identify ICTs skills needs of technical teachers in teaching emerging technologies in technical colleges in Benue State.
2. determine suitable pedagogical skills needed by technical teachers in teaching emerging technologies in trades in technical colleges in Benue State.

Research Questions

1. What are the ICTs skills needs of a technical teachers for the teaching emerging technologies in technical colleges in Benue State?
2. What are the suitable pedagogical skills needed by technical teachers in teaching emerging technologies in technical colleges in Benue state?

Hypotheses

The following null hypothesis was tested at 0.05 level of significance:

- 1: There is no significant difference between the mean response of technical teachers in urban and rural areas on skill needs in ICT by technical teachers.

Methodology

This study adopted descriptive survey design. Ezeji (2004) defined descriptive survey research design as the one which involves the assessment of public (a part or the whole population) opinion using collection of detailed description of existing phenomena with the intent of using the data to justify current conditions and practices or to make better plans for improving phenomena. It assesses the present practices, compares it with set standards and suggests ways of improving on the existing practices, (Owens, 2002, Uzoagulu, 2011,). This study possesses the same

characteristics and attributes with survey design using questionnaire to get public opinion, the intended improvement of skills by technical teachers, assessing the skills training needs of technical teachers in emerging technologies and for skill upliftments. This therefore makes the survey design most appropriate for the study.

The study was conducted in Benue State. Benue State is divided into three senatorial zones A, B and C. There are 8 science and technical colleges and one trade centre located in different parts of the State. All technical teachers in these science and technical colleges were used for the study. Benue State is adjourn to be the food baskets of the nation, the food is produced in rural areas and then brought to urban areas by transportation, the state therefore needs well maintained vehicles, skilled technicians and technical skills in the trades for its transportation. The State also is a civil service State, these civil servants or workers owned vehicles, technical facilities as well as technical business and these vehicles/businesses needs effective maintenance to be able to serve its workers better.

The Population for this study was 38, made up of technical teachers in technical colleges located in rural and urban areas in Benue State. The 38 technical teachers were drawn from all the 8 technical colleges and trade centers as obtained from the Benue State Ministry of Science and Technology Education. There was no sampling because of the management size of the technical teachers.

The instrument for data collection for this study was a structured questionnaire. The instrument was divided into two parts; 1 and 2. Part 1

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sought information on personal data of the respondents while part 2 sought information from the respondents that were relevant to answer research questions. Part 2 was subdivided in 2 sections in line with the specific purposes of the study.

The instrument for this study was subjected to face validation by three experts in the Department of Industrial Technical Education, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka. The experts were supplied with necessary document and information such as the topic of the study, purpose of the study, research question and hypotheses to aid the process of validation. The experts were requested to freely comment on items with reference to good communication of ideas, facts, clarity, correctness and their appropriateness in addressing the purposes of the study. Based on their comments and input, the final copy of the instrument was developed for the study.

The reliability of the instrument was determined using Crombach Alpha (α) reliability technique. The area of pilot-testing was three technical colleges in Nasarawa State, where twenty (20) copies of the questionnaire were administered on technical teachers and 0.89 reliability coefficient was obtained. Nasarawa State has many features that are similar with Benue State beside that Benue and Nasarawa States were once components of one state.

The researcher employed the services of two research assistants to help in administering and collecting the instrument. The researcher handled the administration and collection of the instrument in zone A; 5 technical colleges. The two assistants one each handled zone B and zone C; 4 technical colleges and 3 technical colleges respectively. At the end of the

collection exercise, a total number of 26 copies of questionnaire were returned leaving a short-fall of four questionnaires from 30 respondents.

The data collected for this study was analyzed using mean and t-test. Mean was used to answer the two research questions while t-test was used for testing the only hypothesis at 0.05 level of significance. Any item with a mean value of 3.50 or above was regarded as agree while any items with a mean value less than 3.50 was regarded as disagree. For acceptance of hypothesis, the null hypothesis was accepted for any item whose p-value was greater than the 0.05 but it was rejected for any item that had less than 0.05.

Results

Research Question 1

What are the skills needs of technical teachers in applying ICT for teaching emerging technologies in technical colleges in Benue State?

ICT for teaching emerging technologies:

Table 1: Mean and Standard Deviation of Respondents Responses on Skill Needs by Technical Teachers in ICT for Teaching Emerging Technologies in Technical Colleges in Benue State

N = 36

S/N	Items	M-SD			Remark.
		M	SD	Remark.	
1.	Dismantling of computer hardware parts		4.56	0.65	VHN
2.	Interpretation of computer software	4.69	0.57		VHN
3.	Installation of computer software	4.50	0.77		VHN
4.	Programming Computer	4.47	0.77		HN
5.	Retrieval of information	4.50	0.84		VHN
6.	Identify Computer signals	4.56	0.69		VHN
7.	Interpret computer signals	4.58	0.64		VHN
8.	Read trouble codes on computer vehicle model system	4.50	0.65		VHN
9.	Examine and adjust computer on running vehicles	4.44	0.73		HN
10.	Diagnose and repair computer problem in computerized vehicles	4.50	0.60		VHN
11.	Use computer skills to keep vehicle, in good operation condition	4.67	0.63		VHN
12.	Identify and use relays to execute computer commands that are independent of sensors (input), control unit and actuators (output)	4.44	0.77		HN
13.	Scan and control computer problems in a computerized automobile vehicles	4.44	0.77		HN
14.	Carry out basic tests and repairs on computer system using computer animation	4.42	0.73		HN
15.	Access larger networks and work on microprocessors on on-board diagnosis (OBD)	4.42	0.69		HN
Cluster mean			4.51	0.56	VHN

Results in Table 1 showed that the following skills are very highly needed (VHN) by technical teachers in ICT for teaching emerging technologies; Knowledge of computer hardware (4.56), Knowledge of computer software (4.69), Knowledge of logging (4.50), Retrieval of information (4.50), Computer signals (4.56), Interpretation of computer signals (4.58), Read trouble codes on computer vehicle model system (4.50), Diagnose and repair computer problem in computerized vehicles (4.50) and Use of computer skills to keep vehicle, machinery and facilities in good operation condition (4.67),

Computer programming (4.47),, Examine and adjust computer on running machinery (4.44), Identify and use relays to execute computer commands that are independent of sensors (input), control unit and actuators (output) (4.44), Scan and control computer problems in a computerized system or operation(4.44), Carry out basic tests and repairs on computer system using computer animation (4.42) and Access larger networks and work on microprocessors on on-board diagnosis (OBD) (4.42). The cluster mean of 4.51 with a standard deviation of 0.56 showed that the technical teachers in technical colleges in Benue

However, result showed that the following skills are highly needed (HN) by technical teachers in

State very highly needed (VHN) ICT skills for teaching emerging technologies in technical colleges in Benue State.

Table 2: Mean and Standard Deviation of Respondents Responses on the Suitable Pedagogical Skill Needs of Technical Teachers in using Emerging Technologies in Technical Colleges in Benue

State								Remark.	
Items									
N = 36									
S/N						□	SD		
16.	Examine the curriculum of the training programme	4.33	0.63	HS					
17.	Select and adopt relevant methods for content delivery	4.42	0.69	HS	18.	Specify			
	instructional concepts in learnable units	4.36	0.54	HS					
19.	Select and emphasis appropriate techniques for instructional delivery	4.44	0.55	HS					
20.	Adopt demonstration method	4.47	0.56	HS	21.	Adapt of observation method.	4.33	0.67	HS
22.	Engage in laboratory practical project sessions.	4.39	0.64	HS					
23.	Individualized instruction method.	4.25	0.69	HS	24.	Group study during practical lessons.	4.28	0.84	HS
25.	Up-skilling of students in out of class tasks.	4.39	0.72	HS					
26.	Use of ICT for instructional purposes.				4.42	0.69	HS		
	Cluster mean				4.37	0.43	HS		

Research Question 2

What are the suitable pedagogical skill needs of Technical teachers in teaching emerging

The result revealed highly suitable (HS) pedagogical skill needs of technical teachers in teaching emerging technologies in technical colleges. The cluster mean of 4.37 with standard of 0.43 means that the items in Table 2 are highly suitable (HS) pedagogical skill needs of technical teachers in teaching emerging technologies in technical colleges in Benue State.

technologies in technical colleges in Benue State?

Hypotheses 1

The mean responses of technical teachers in urban and rural areas will not differ significantly on skill needs of technical teachers in ICT for the teaching of emerging technologies in technical colleges in Benue State.

Table 3: t-test Analysis of the Mean Responses of Technical Teachers in Urban and Rural Areas on their Skill Needs in ICT for the Teaching of Emerging Technologies in Technical Colleges in Benue

State.

Items

SD

S/N	Location	Dem	Isaiah I.	Achanson ₂	C.R.	& Ameh, Agha ₂	Dec.	t-cal	df	Sig	
27.	Knowledge of computer hardware	Rural	4.33	0.77	NS			-1.47	34	0.15	
		Urban		4.67	0.56						
28.	Knowledge of computer software	Rural	4.58	0.66	-0.81	34	0.42	NS	Urban	4.75 0.53	
29.	Knowledge of logging	Rural	4.33	0.98	-0.91	34		0.37		NS	
		Urban		4.58	0.65						
30.	Computer programming	Rural	4.08	0.90	-2.25	34	0.03	S	Urban	4.67 0.63	
31.	Retrieval of information	Rural	4.42	0.90	-0.41	34	0.68	NS	Urban	4.54 0.83	
32.	Computer signals	Rural	4.42	0.90	-0.85	34		0.40		NS	
		Urban		4.63	0.57						
33.	Interpretation of computer signals	Rural	4.33	0.88	-1.68	34	0.10	NS	Urban	4.71 0.46	
34.	Read trouble codes on computer vehicle	Rural	4.17	0.57	-1.29	34	0.03	S	model system	Urban	4.67 0.63
35.	Examine and adjust computer on running	Rural	4.17	0.71	-1.64	34	0.11	NS	vehicles	Urban	4.58 0.71
36.	Diagnose and repair computer problem in	Rural	4.25	0.62	-1.79	34	0.08	NS	computerized vehicles		
		Urban		4.63	0.57						
37.	Use computer skills to keep vehicle, in good	Rural	4.33	0.88	-2.38	34	0.02	S	operation condition	Urban	4.83 0.38
38.	Identify and use relays to execute computer	Rural	4.25	0.96	-1.07	34	0.29	NS	commands that are independent of sensors	Urban	4.54 0.65
	(input), control unit and actuators (output)										
39.	Scan and control computer problems in a	Rural	4.17	0.93	-1.56	34		0.13		NS	
	computerized automobile vehicles	Urban	4.58	0.65							
40.	Carry out basic tests and repairs on computer	Rural	4.25	0.86	-0.97	34	0.34	NS	system using computer animation	Urban	4.50 0.68
41.	Access larger networks and work on	Rural	4.08	0.66	-2.15	34	0.04	S	microprocessors on on-board diagnosis	Urban	4.58 0.65 (OBD)
	Cluster mean	Rural		4.28	0.68			-1.85	34	0.07	NS
		Urban		4.63	0.45						

Conclusion

Based on the findings of this study, it is concluded that technical teachers teaching in technical colleges in Benue State, Nigeria need skills in ICT and emerging technologies for effective teaching of trade courses in technical colleges in Benue State. There is, therefore, an urgent need to improve skills of technical teachers. This is necessary in order to teach the students the skills of emerging technologies with its sophistication, complexities of systems and components effectively.

Implications

The educational implications of this study are: the technical teachers when improved iii skill acquisition in the area of ICT and emerging technologies would teach more effectively. When technical teachers' skills are improved, technical students will be able to maintain and repair emerging technologies vehicle's components arid systems very well on graduation. When technical students under such improved skilled teachers graduate, they would become economically self-reliant.

Recommendations

Researcher made the following recommendations;

- i. There should be in-service training on ICT and emerging technologies. The administrators should organize workshops

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and seminars where technical teachers could be trained by experts on ICT and emerging technologies systems and components.

- ii. Technical teachers should be granted scholarship inform of study leave with pay, to further their education most especially in ICT and emerging technologies in various trades.
- iii. New technological development having implications for technical trades such as ICT and emerging technologies should be integrated into the skills and learning contents of the curriculum of technical education programme.

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